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RECORD OF DECISION

ZORTMAN AND LANDUSKY MINES

RECLAMATION PLAN MODIFICATIONS

AND

MINE LIFE EXTENSIONS

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by

Montana Department of Environmental Quality

U.S. Department of the Interior
Bureau of Land Management

June 1998

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June 1998

Dear Reader,

Attached is your copy of a new Record of Decision (ROD) regarding the Zortman and Landusky Mines Reclamation Plan Modifications and Mine Life Extensions. Since the recent announcement by Pegasus Gold and Zortman Mining that they were canceling their mine expansion plans, Alternative 7, which was selected for implementation in 1996, was no longer viable and a new alternative had to be selected to provide for reclamation without the additional mining.

The decision was made to select Alternative 3 from the 1996 Final Environmental Impact Statement (EIS). Alternative 3 does not approve mine expansion but provides for reclamation incorporating environmental protective measures developed through the EIS process. These measures include requirements for partial pit backfilling, thicker soil covers, isolation of potentially acid-forming rock, erosion control, revegetation to enhance wildlife habitat, and provisions for capture and treatment of seepage which may threaten water quality. The ROD contains a complete list of all the stipulations required by the agencies to reduce environmental impacts along with a detailed rationale for the decision.

This decision completes a process which the agencies began over five years ago to upgrade the reclamation plans in order to address acid rock drainage problems at the mines. We wish to thank everyone who participated in the EIS-process over the years. Should you require additional copies of the ROD, or have any questions, please contact either Art Compton, DEQ at (406) 444-6791 or Scott Haight, BLM at (406) 538-7461.

Mark A. Simonich, Director
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Introduction & Background

The Zortman and Landusky mines are located in the Little Rocky Mountains of northcentral Montana. Modern mining within this historic mining district began in the late 1970s using the first cyanide heap leach process in the state. The State of Montana prepared an EIS on the Zortman and Landusky mining operations in 1979. After completion of the EIS, the Montana Department of State Lands approved Operating Permit 00096 for the Zortman Mine and Operating Permit 00095 for the Landusky Mine. The mines operate in close proximity to each other on a mixture of private lands and public lands managed by the Bureau of Land Management (BLM). After the BLM surface management regulations went into effect in 1981, the BLM approved Plan of Operations MTM-77778 for the Zortman Mine and Plan of Operations MTM-77779 for the Landusky Mine. The permits for both mines have been amended approximately 10 times since 1979 as mine operations have expanded or been modified.

On May 11, 1992, Zortman Mining, Inc. (ZMI) and Pegasus Gold Corporation, operators of the Zortman and Landusky mines, filed an application with the Lewistown District BLM and the Montana Department of Environmental Quality (formerly the Department of State Lands) to expand mining operations at the Zortman Mine. The proposal included: expansion of existing mine pits to extract additional ore; a 150-acre, 60-million ton capacity waste rock disposal area; ore crushing facilities; a 2½-mile ore conveyor system; a 200-acre, 80-million ton capacity leach pad; new processing plant and ponds; a limestone quarry; and other associated constructions, such as access roads and power lines.

An Environmental Impact Statement (EIS) was initiated by the Montana Department of Environmental Quality (DEQ) and the BLM in response to ZMI's application to expand mine operations at the Zortman Mine. The BLM and DEQ (referred to as "the agencies") were co-lead agencies for preparation of the EIS. The Environmental Protection Agency (EPA) and the Army Corps of Engineers (COE) participated as cooperating agencies.

Acid rock drainage (ARD) has been identified as a major issue at both the Zortman and the Landusky mines. In early 1993, the BLM and the State of Montana required ZMI to modify its existing operating and reclamation plans at both mines in response to impacts created by ARD.

In August of 1993, the State of Montana filed suit in State District Court against ZMI and Pegasus Gold Corporation, alleging violations of the Montana Water Quality Act, due in part to ARD. In June of 1995, EPA filed suit in Federal District Court alleging that discharges from the mines were in violation of the Federal Clean Water Act. Thereafter, the State of Montana filed suit in Federal District Court. Island Mountain Protectors and the Fort Belknap Community Council had also filed citizen suits which included these same charges. All parties to the case entered into negotiations and developed a Consent Decree that was lodged in Federal District Court on July 22, 1996, and made available for public comment. The Consent Decree was entered by the Judge as effective on September 27, 1996.

In November 1993, an environmental assessment on proposed ARD-related corrective measures for the Landusky Mine was released for public comment. Corrective measures for the Zortman Mine were to be included in the Zortman Mine Expansion EIS. In March 1994, the agencies decided to combine analysis of the Landusky Mine corrective measures with the Zortman Mine EIS process. ZMI then submitted modified mining and reclamation plans for the Landusky Mine which included a relatively small amount (7.6 million tons) of additional ore mining and processing. As a result, the scope of the Draft and the Final EIS, includes expanded mining at both mines along with the reclamation and remediation plans needed at both mines for control of ARD.

On October 25, 1996, the agencies issued a Record of Decision (ROD) which approved expanded mining and modified reclamation plans under Alternative 7, the preferred alternative of the Final EIS. Soon thereafter, ZMI announced it was suspending plans for mine expansion due in part to low gold prices. On January 16, 1998, ZMI and Pegasus Gold Corporation, filed for reorganization under Chapter 11 of the Bankruptcy Code. On April 2, 1998, Pegasus Gold canceled plans for further mining at the Zortman and Landusky mines.

The 1996 ROD selected an alternative that approved modified reclamation plans in combination with expanded mining and leaching activity. Since the plans for additional mining have been canceled, the agencies are reissuing the ROD in order to select an alternative that provides for reclamation of the mines without the proposed mine expansions. The modified reclamation plans are needed to prevent unnecessary or undue degradation as required by the BLM State Director's decision of April 13, 1993, issued under 43 CFR 3809.1-7(c)(4); and to meet the DEQ requirement that the reclamation plans be changed to address acid rock drainage, issued under Section 337 of the Metal Mine Reclamation Act (82-4-337, MCA).

Decisions

After considering all relevant issues, alternatives, potential impacts, and management constraints, the agencies' hereby withdraw the selection of Alternative 7 and select Alternative 3 for implementation. Alternative 3 approves modification of both mines' reclamation plans with added mitigation to reduce environmental impacts and to improve the potential for long-term reclamation success. Chapter 2 of the Final EIS provides a comprehensive description of Alternative 3.

Stipulations

Alternative 3 implements the reclamation provisions of the preferred alternative in the Final EIS (Alternative 7) without the additional mining and mineral processing. Alternative 3 adds a considerable amount of mitigating measures to ZMI's proposed action presented under Alternative 2. These have been developed through the EIS process to prevent unnecessary or undue degradation and achieve comparable stability and utility of mined lands with adjacent lands. These mitigation measures are required as conditions of approval (stipulations) to the Modified Plans of Operations and the Operating Permit Amendments. The following is a list of the stipulations that must be followed by the operator to implement the selected alternative. A brief rationale for each stipulation is also provided. These conditions will be included in the agencies' permit/approval documents.

Facility Location:

1. ZMI must remove the existing Alder Gulch waste rock dump located in Carter Gulch and place it as backfill in the Zortman mine pit. Once the waste rock has been removed, ZMI must reclaim the dump footprint consistent with the characterization and reclamation requirements of Stipulation 17. To the extent feasible, soil is to be salvaged from the existing dump prior to excavation of the waste rock.

   The existing Alder Gulch waste rock dump is seeping poor quality water and removal of the dump will reduce impacts to the Carter Gulch/Alder Gulch drainages and will eliminate the need for a seepage collection system at this location.

2. After cyanide detoxification, ZMI must leave the Zortman 85/86 leach pad in place. Spent ore is to be regraded to 3:1 overall and the surface reclaimed using the water barrier and water balance covers required in Stipulation 15. The spent ore is to be regraded to keep cyanidated material on liner in accordance with Stipulation 16. A permanent diversion is to be constructed around the perimeter of the leach pad, adequate to convey anticipated maximum flows with one foot of freeboard, from the reclaimed mine pit complex into Ruby Gulch.

   Removal of the Zortman 85/86 leach pad is not necessary as the source of poor quality

water in Ruby Gulch has been determined to be from the mine pits (Final EIS, page 3-58). In addition, removal of spent ore would place cyanidated material off-liner, and disturb material which may have accumulated ARD reaction products. These materials have the potential to impact water quality and should remain within the present leach pad containment system. The agencies reserve the right to modify this stipulation, and require removal of some or all of the leach pad, should new information become available.

3. ZMI must remove the OK waste rock dump and the Ruby sulfide stockpile. The Ruby waste rock dump must be pushed down slope to fill in the Mint pit. The material must be selectively placed as backfill in the pit complex. ZMI must re-salvage cover soil and reclaim the waste rock footprints using the reclamation covers identified in Stipulation 17.

   These dumps contain acid-generating material that needs to be selectively handled to minimize acid formation.

4. ZMI may not mine limestone at the LS-1 limestone quarry. Instead, ZMI must mine limestone needed for reclamation at the Zortman Mine from the LS-2 site located west of the Zortman townsite (see Exhibit 1 in the Final EIS). This quarry must be reclaimed using the same procedures proposed by ZMI in their application for the limestone quarry site in Upper Lodgepole Creek.

   This reduces overall disturbance and avoids impacts to the Lodgepole Creek drainage from access road construction and mining of limestone.

5. ZMI may not mine limestone at the King Creek limestone quarry. Instead, ZMI must mine limestone needed for reclamation at the Landusky Mine from the quarry located in Montana Gulch (see Exhibit 2 in the Final EIS). This quarry must be reclaimed using the same procedures proposed by ZMI in their application for the limestone quarry site in Upper Lodgepole Creek.

   This avoids impacts to the King Creek drainage from access road construction and mining of limestone.

Construction and Rock Characterization:

6. For general construction and use in the reclamation covers, ZMI must classify "Non-Acid Generating" (NAG) waste rock, associated with the mining of ore, by using the following criteria:

   a) Rock may not be composed of breccia, felsic gneiss, monzonite, quartzite, or trachyte lithologies;

b) Rock composed of amphibolite, mafic gneiss, shale, dolomite, or limestone must have a total sulfur content less than or equal to 0.8 percent, and a paste pH of 6.0 or greater;

c) Rock composed of syenite must have a total sulfur content less than or equal to 0.2 percent, a paste pH of 6.5 or greater, and a Net Neutralization Potential (NNP) of 0 or greater;

d) Rock composed of syenite may only be used in reclamation covers where NAG is specified and must not be used where it would be in contact with water such when used for riprap in drainage channels or as underdrains.

e) ZMI must demonstrate that rock meets the above criteria by sampling and analyzing lithologies from every blasthole providing non-acid generating material for total sulfur, paste pH and Neutralizing Potential (Miller 1995). All blast holes within a discrete minable block (25 feet x 25 feet) must meet these criteria. Reports that document rock characterization must be submitted monthly to the agencies.

These criteria are necessary to provide that rock with acid-forming potential is adequately identified and not placed where it will degrade waters or affect reclamation success.

7. ZMI must use only non-acid-generating materials in facilities conveying surface water or seepage water. Unmineralized limestone, or other suitable material, must be used by ZMI for fill in state waters. Underdrains and seepage collection systems must be built with coarse and durable unmineralized carbonates.

Material which meets the above NAG criteria does not necessarily meet the state requirement for clean fill suitable for placement in waters of the state. Therefore, unmineralized limestone is required for fill in state waters as an additional precaution to buffer acidic drainage and to minimize the potential for impacts to water quality.

8. ZMI must demonstrate to the agencies' satisfaction that any material excavated from the Goslin Flats area to be used for reclamation purposes has suitable geotechnical and geochemical characteristics consistent with Stipulation 6.

Material removed from the Goslin Flats borrow site may prove useful as a supplement or alternate to the cover soil, subsoil, or clay liner proposed for use in general construction and reclamation. However, this requirement is intended to prevent the material from being used without prior geotechnical or geochemical characterization.

9. ZMI must install the geosynthetic clay liner (GCL) according to the manufacturers' specifications. The installation is to be monitored by a third-party engineer, qualified with

the expertise to effectively monitor the installation of this material, who must submit monthly reports directly to the agencies. The engineer conducting the oversight of GCL installation must keep a daily written record of the installation, including documentation of quality control testing. The testing is to follow the manufacturers' specifications and include testing of: bentonite mass per unit area of GCL, bentonite free swell, and bentonite mass per unit length of seam. These test results are to be included in the monthly reports. All reports must be submitted concurrently to DEQ, BLM and the operator.

A testing and reporting program is needed to ensure appropriate installation of the GCL and to attain maximum GCL performance under field conditions.

10. ZMI must use a non-calcareous material for the capillary break/drain layer placed over the GCL used in the reclamation covers.

This is to avoid geochemical degradation of the low permeability character of the GCL.

11. ZMI must construct the capillary break/drain layer in the water barrier cover using NAG material at least 3 feet thick over 95 percent of the area covered, with a minimum thickness of 2.5 feet at any one location. If additional subsoil is available (after construction of the water balance covers), ZMI must substitute subsoils for the coarse NAG layer. If subsoil is substituted, the capillary break/drain layer above the GCL may be decreased accordingly, but must not be less than 12 inches at any location.

This is to provide for adequate drainage above the GCL and maximize use of available soil materials.

12. ZMI must place backfilled waste rock in lifts not greater than 25 feet thick.

This requirement is to ensure minimal settlement of the backfilled material, ensuring slope stability and reclamation cover integrity.

13. ZMI must construct the lowest layer of the Landusky mine pit backfill with a minimum 5-foot thick lift of acid-buffering material. Waste rock placed into the interval of the pits that have a perched or a fluctuating water table must be non-acid forming according to the criteria in Stipulation 6. Waste rock placed below the zone of fluctuating water table, in the lower portions of the pit which are always saturated, must contain less than 0.5 percent total sulfur.

By using waste rock with low sulfide mineral content, impacts to groundwater beneath the reclaimed mine pits are reduced.

14. ZMI may not perforate leach pad liners until monitoring of heap effluent indicates that

discharge effluent limits will be met through the spring runoff event. ZMI must engineer perforation of the heap leach pad liners to be reversible. Liner perforation design details must be submitted to the agencies at least 6 months prior to the intended perforation date to verify compliance with this requirement.

Delayed liner perforation allows the agencies to ensure that the risk of post-reclamation water quality degradation is minimal before perforation. Reversible liner perforation is necessary to ensure that the discharge can be halted in the event that post-reclamation leachate quality should become unacceptable.

Surface Reclamation:

15. ZMI must use water balance and water barrier reclamation covers. These reclamation covers are shown on Figure 2.11-4 in the Final EIS. Cover soil must be placed at least 12 inches thick on all disturbances, either directly over NAG surfaces (as defined by Stipulation 6) or as the uppermost layer of the reclamation covers. Where redisturbance of the site is necessary, cover soil on facilities that have previously had surface reclamation is to be removed and stockpiled for reuse. These covers are to be used on the backfilled waste rock at the Zortman and Landusky mine pit complexes and all other existing reclaimed or unreclaimed facilities unless specified otherwise below.

    These reclamation covers increase revegetation potential, reduce soil loss, and improve long-term surface stability with low infiltration rates and low maintenance requirements.

16. Unless specified elsewhere, ZMI must regrade facilities to an overall 3:1 slope with constructed benches every 100 vertical feet between benches. In order to achieve the slope reductions, while minimizing additional disturbance, ZMI may have to off-load some material from existing facilities and place it as fill in other areas. Some slopes may be graded at steeper angles in specific locations in order to keep cyanidated material on liners, facilitate stormwater drainage, and improve visual aesthetics. At least 60 days in advance of implementation, ZMI must submit for agency review its planned post-reclamation topography and plans for placement of any off-loaded spent ore to verify compliance with regrading, off-loading and fill requirements.

    The modified slope angles and bench spacing are needed to reduce the rate of soil loss, thus increasing overall surface reclamation stability and success, yet avoid placement of materials off-liner where they are likely to cause surface water contamination.

17. ZMI must characterize the footprints of removed facilities, haul roads, or areas where sulfide materials have been stored or spilled by testing for total sulfur content on 100-foot centers. ZMI must reclaim areas with less than 0.5 percent total sulfur with 12 inches of cover soil and vegetation. ZMI must reclaim areas with greater than 0.5 percent total

sulfur with a 12-inch layer of non-acid-generating material to be placed between the substrate and the 12 inches of cover soil.

Reclamation over substrate with greater than 0.5 percent sulfur content can result in the acidification of the cover soil, dramatically reducing revegetation success. The additional 12 inches of non-acid-generating material prevents soil acidification.

18. ZMI must restrict long-term soil loss rates on reclaimed slopes to less than 2 tons/acre/year. ZMI must stabilize rills or gullies that might breach the cover soil layer by regrading, placement of additional cover soil, and installation of additional erosion control measures.

This performance requirement keeps soil loss less than anticipated soil generation rates and will enhance long-term reclamation success.

19. The following are specific surface reclamation stipulations for the existing heap leach facilities at the Zortman Mine. These stipulations are required to minimize erosion, enhance revegetation establishment, and minimize infiltration, which may generate leachate.

a) If determined necessary to prevent long-term acidification of cover soil or generation of acidic leachate, ZMI must remove and salvage the existing reclamation cover on the Zortman 79/80/81 leach pad. This area is to be reclaimed using the water balance and water barrier reclamation covers required in Stipulation 15.

b) ZMI must reclaim the Zortman 82 leach pad using the water balance and water barrier reclamation covers required in Stipulation 15.

c) ZMI must reclaim the Zortman 83 and 84 leach pads using the water balance and water barrier reclamation covers required in Stipulation 15.

d) ZMI must reclaim any portion of the Zortman 85/86 leach pad and retaining dike not removed during backfill of the Zortman mine pit complex using the water balance and water barrier reclamation covers required in Stipulation 15.

e) ZMI must reclaim the Zortman 89 leach pad using the water balance and water barrier reclamation covers required in Stipulation 15. ZMI must test the Zortman 89 leach pad retaining dike for sulfur content as described in Section 2.8.2.2 of the Final EIS. If total sulfur exceeds 0.5 percent in more than 10 percent of the samples tested, ZMI must re-reclaim the dike using the water balance cover. ZMI must remove and salvage the existing reclamation cover soil prior to placement of the new reclamation cover or add enough reclamation cover material to meet the

water balance cover requirements.

20. The following are specific surface reclamation stipulations for the existing heap leach facilities at the Landusky Mine. These stipulations are required to minimize erosion, enhance revegetation establishment, and minimize infiltration which may generate leachate.

    a) If determined necessary to prevent long-term acidification of cover soil or generation of acidic leachate, ZMI must remove and salvage the existing reclamation cover soil from the Landusky 79 leach pad. This leach pad must be reclaimed using the water balance and water barrier reclamation covers required in Stipulation 15.

    b) ZMI must reclaim the Landusky 80/81/82, 83, 84, and 85/86 leach pads using the water balance and water barrier reclamation covers required in Stipulation 15. ZMI must reslope the 85/86 retaining dike to at least 2.5:1, and sufficient to allow placement and retention of the water balance reclamation cover. ZMI must remove and salvage the existing reclamation cover soil prior to slope reduction and placement of the new reclamation cover.

21. Concurrent with regrading, ZMI must remove spent ore from the north side of the Landusky 87, 91 and 87/91 leach pads so that the entire regraded leach pad achieves the required 3:1 overall slope with benches every 100 vertical feet consistent with Stipulation 16. ZMI may not push ore or waste rock off the liner into adjacent northern drainage areas. Spent ore from the northern portions of the leach pad may be redistributed to the south, west and east of the 87/91 pad complex, or placed on the upper levels of the leach pad. This material may be placed off the liner, away from drainages, only if it has been verified by the agencies that it meets a detoxification criteria of less than 0.5 milligrams of weak acid dissociable cyanide per kilogram of spent ore, or other requirements applicable to preventing water pollution.

    This requirement is to prevent runoff from the reclaimed leach pad from discharging north of the mine site into drainages that eventually enter the Fort Belknap Indian Reservation. Any discharges will be directed to the south for capture and treatment. Sampling of the heap effluent, as done for total heap detoxification, is not appropriate for off-loading small ore segments from this large heap complex. Instead, a bottle roll test is to be used containing 1 to 2 kilograms of ore with an extraction solution to sample ratio of 2:1 adjusted to a pH of greater than 12 with sodium hydroxide (This is the standard test procedure used elsewhere for off-loading spent ore).

22. ZMI must reslope the Landusky 91 leach pad dike so that no slopes are steeper than 2.5:1 with constructed benches every 100 vertical feet. The dike must immediately thereafter be reclaimed using the water balance reclamation cover required in Stipulation 15.

This is needed to arrest erosion on the dike, enhance revegetation, and limit infiltration.

23. The existing reclamation covers on the Gold Bug waste rock repository and the Mill Gulch waste rock dump may be left in place. However, ZMI must place additional cover soil on these facilities should monitoring indicate the existing covers are not providing comparable performance to the water barrier and water balance reclamation covers required in Stipulation 15. ZMI must monitor comparable performance by monitoring vegetation cover, soil erosion, and infiltration rates.

These existing reclamation covers may need enhancement to achieve the same long-term performance as the preferred reclamation covers.

24. ZMI must test and evaluate those portions of the Montana Gulch waste rock dump not used for backfill or as reclamation material, for total sulfur content as described in Section 2.8.2.2 of the Final EIS. If the waste rock does not meet the criteria, ZMI must reclaim the remaining dump using the water barrier and water balance reclamation covers required in Stipulation 15. ZMI must remove and salvage existing reclamation cover soil prior to excavation of any waste rock or placement of the new reclamation cover.

If it is determined that this dump material can generate acid, the reclamation covers shown in Alternative 3 are more effective at restricting long-term infiltration of precipitation.

25. Instead of proposed Reclamation Cover A, ZMI must cover mine pit benches with 12 inches of NAG material overlain by 12 inches of cover soil using retreat reclamation.

This will prevent acidification of the cover soil by underlying rock on mine pit benches.

26. ZMI may not use crested wheatgrass in the reclamation seedmix. ZMI may not include trees in the general revegetation. Trees may only be used where visual impact mitigation is specifically needed as described in Stipulation 42 .

Increasing the use of grasses, forbs and shrubs is required to enhance wildlife habitat.

27. ZMI must achieve a canopy cover for revegetation equal to 90% of the canopy cover of adjacent natural grassland communities at similar elevations with similar slope and aspect, at the same time (Daubenmire 1959). ZMI must exclude livestock from revegetated areas until the cover criterion has been met or livestock are judged necessary by the agencies to enhance soil development.

This success criteria for revegetation allows plant communities to become well established and natural vegetation succession processes to continue. Controlled livestock grazing can be used as an effective reclamation tool.

Water Management:

28. ZMI must conduct mine activities in accordance with both the Water Quality Improvement Plan contained in Appendix A of the Final EIS and the Water Quality Improvement and Monitoring Compliance Plan (Compliance Plan) contained in Appendix A of the Consent Decree entered September 27, 1996, between EPA, the State of Montana, the Fort Belknap Community Council, and Island Mountain Protectors. Should the two plans conflict, the more protective measures must be followed. ZMI must construct water control, capture and treatment facilities for both of the existing mines and for the reconfigured mine facilities approved in these Operating Permit Amendments and modified Plans of Operations. This stipulation requires construction of any water capture or handling facilities that may be necessary for the Swift Gulch area.

While the Consent Decree addresses water management needs for the existing mining operations, it does not completely address those that may be needed for the modified reclamation that will occur under Alternative 3. Designs for water management are contained in Appendix A of the EIS and are required to be implemented by this decision. The water in Swift Gulch (BKSS-1) down gradient of mine facilities requires capture and treatment.

29. ZMI must assume, for design purposes, that continual water treatment will be necessary in the post-closure mine environment. Any subsequent design, construction, and maintenance of water conveyance, capture and treatment systems is to be based upon the need for long-term water treatment.

While the use of the stipulated enhanced reclamation covers may reduce or even eliminate the need for long-term water capture and treatment to meet water quality objectives in many of the affected drainages, this is not certain.

30. ZMI must design and construct all permanent drainage and diversion ditches, and water capture and treatment systems to accommodate runoff from a 6.33-inch, 24-hour storm event with 1 foot of freeboard as a minimum.

The 100-year storm event design criterion is needed to ensure adequate drainage capacity, and to protect reclaimed areas and adjacent water resources.

31. ZMI must design and construct all seepage water capture and treatment systems to accommodate peak seepage rates generated by a 6.33-inch, 24-hour storm event.

The 100-year storm event design criterion is needed to protect area water resources. Increased pumping capacity and holding ponds can be used to meet this requirement to compensate for the limited space at some capture points.

32. ZMI must backfill the Zortman mine pit complex to a level which will accommodate the required amount of relocated spent ore and/or waste rock and configure the backfill in a manner that will allow free drainage of surface water, without impoundment in the pit complex. ZMI must route all surface water runoff from the Zortman mine pit area and waste rock repository to be free draining to the south into Alder Spur and Ruby Gulch. ZMI may not discharge runoff from disturbance areas into Lodgepole Creek. Final designs showing the backfill level and drainage plans must be submitted to the agencies at least 60 days prior to implementation for agency review to verify ZMI compliance with this stipulation.

This confines runoff which may come in contact with acid-forming materials to drainages that flow to the south and limits the potential for impacted waters to enter the Fort Belknap Reservation. This stipulation does not constitute authorization as required by the Montana Water Quality Act.

33. ZMI must construct a drainage channel along the west margin of the Landusky 85/86 leach pad to unblock surface water drainage in the western tributary of Montana Gulch.

The current drainage configuration does not adequately convey water away from the leach pad and will not function for post-reclamation drainage.

34. ZMI must backfill the Landusky Mine pit complex to a minimum elevation of 4740 feet (at the south end of the pit complex) to create a surface which will freely drain into Montana Gulch. Material used in backfill must come from existing waste rock dumps and leach pads, mined waste rock, ore, limestone quarries, or be recovered during drainage channel construction. Final designs showing the backfill level and drainage plans must be submitted to the agencies at least 60 days prior to planned implementation for agency review to verify ZMI compliance with this stipulation.

This reduces the potential for precipitation and surface water runon to infiltrate through acidic materials beneath the mine pit and into groundwater.

35. ZMI must direct runoff from the Landusky Mine pit complex to Montana Gulch by constructing a drainage notch between the August/Little Ben pit and Montana Gulch. The channel is to be sized to convey runoff from a 6.33 inch, 24-hour storm event at a minimum. Runoff from the pit area must be routed through the channel and along the existing haul road route around the eastern perimeter of the Montana Gulch waste rock dump and the Landusky 85/86 leach pad. ZMI may not discharge runoff from the mine pits into King Creek. Final designs showing the backfill level and drainage plans must be submitted to the agencies at least 60 days prior to implementation for agency review to verify ZMI compliance with this stipulation.

This is to prevent the routing of pit runoff into the August tunnel where it would recharge

groundwater beneath the pits, or contact waste rock in the lower portions of the Montana Gulch waste rock dump, and possibly generate contaminated leachate. Routing around the 85/86 leach pad is needed so as not to exceed the flow capacity of the underdrain.

36. ZMI must divert runon water away from portions of mine pit walls that have acid-forming potential and cannot be covered. ZMI must capture runoff from pit highwall areas using collection ditches at the base of the highwall and segregate it from stormwater which falls on the reclaimed pit floors. Highwall runoff is to be routed to collection areas for transport to the respective water treatment plant.

    Highwall runoff has a greater chance of becoming contaminated than runoff from reclaimed surfaces. This stipulation is required to minimize the amount of highwall runoff and to keep what does occur from contaminating the relatively clean stormwater derived from reclaimed areas.

37. ZMI must construct runoff controls, using a 6.33-inch, 24-hour design storm event, for those portions of the Montana Gulch waste rock dump not used for reclamation material or pit backfill.

    This is the calculated 100-year storm event frequency. Runoff controls using this design criterion are necessary to convey stormwater away from, and off of, mine waste rock to minimize water contact with potentially acid-generating materials or stored reaction products.

38. ZMI may not treat land application disposal (LAD) solutions with hypochlorite. ZMI may use hydrogen peroxide as an acceptable reagent substitute, but if hydrogen peroxide is used, residual peroxide levels must be reduced so as to be non-toxic to vegetation.

    This requirement is to prevent LAD of treated process solutions from having an adverse impact to vegetation. Hypochlorite use is known to have killed some evergreen species and temporarily reduced understory growth.

Wildlife and Waters of the U.S.:

39. ZMI must implement the Aquatic Ecosystem Mitigation Plan in Appendix F of the Final EIS as modified or required by the U.S. Army Corps of Engineers.

    Implementation of this Mitigation Plan is needed in order to mitigate for past and present impacts to wetland and non-wetland waters of the U.S. This addresses the cumulative impacts of past mining activity on the area aquatic ecosystems.

40. ZMI must remove the tailing in Ruby Gulch above the town of Zortman from the drainage

and use the tailing for reclamation or construction materials, or as pit backfill. ZMI must restore the Ruby Gulch drainage as on-site, in-kind, mitigation for disturbance to waters of the U.S. by Zortman and Landusky mine facilities. Specific removal and reconstruction plans must be submitted to the agencies at least 60 days prior to each removal phase described in Appendix F of the Final EIS in order to verify compliance with this stipulation.

Removal of the tailing restores a historically impacted drainage, improves watershed conditions, mitigates past impacts to waters of the U.S., and provides useful reclamation and construction material that would otherwise have to be obtained by additional mining or crushing.

Social, Cultural and Aesthetics:

41. ZMI must use pilot cars to escort haul truck convoys moving reclamation or construction materials over public roads. ZMI convoys may not exceed a speed of 15 mph when traveling through the communities of Zortman or Landusky.

The lower speed will reduce the noise and dust nuisance. Pilot cars and a 15-mph speed limit will increase public safety.

42. ZMI must recontour all spent ore heaps and waste rock piles to provide a topography that blends into the surrounding landscape in a manner which meets visual resource management (VRM) Class II criteria. Straight edges are to be rounded. Large, flat surface areas are to be broken with changes in contour simulating natural drainage patterns. Trees are to be planted for visual screening at locations identified by the agencies. ZMI must submit detailed recontouring and planting plans for individual facilities to the agencies at least 60 days prior to regrading for review to verify compliance with this stipulation.

This requirement is needed to minimize the post-reclamation visual impact of the mining operation. However, this requirement is subordinate to the primary reclamation objectives of stable reclamation surfaces that limit infiltration of precipitation into mine waste material, minimize erosion rates, and re-establish of natural plant succession processes.

Air Quality:

43. ZMI is limited to 120 haul truck trips (one-way) in a single day moving reclamation or construction materials through the town of Zortman.

This requirement is necessary in order to maintain air emissions below the 24-hour

standard for particulates.

Additional Monitoring:

44. ZMI has complied with Stipulation 54(a) through (l) of the 1996 ROD regarding placement of additional surface water monitoring stations and groundwater monitoring wells. ZMI must continue to sample all groundwater monitoring wells and surface water monitoring stations according to the currently approved monitoring programs, must modify monitoring programs when determined necessary by the agencies, and must receive approval from the agencies for any modifications to the monitoring programs ZMI wants to make prior to implementation.

45. ZMI must continue to implement the expanded Reclamation Surface Performance Study to include monitoring of the seepage rates and concentrations from the base of mine waste units. This monitoring is to be conducted on a frequency adequate to develop long-term hydrographs for each site (Ruby Gulch, Alder Spur, King Creek, Montana Gulch, Mill Gulch and Sullivan Creek). Flow data must be submitted monthly. Hydrographs must be submitted with the annual water resources report for each mine facility discharge.

The hydrographs are to be used to calculate response time to high runoff events, evaluate performance of the reclamation covers at limiting infiltration, and to predict opportune sampling times.

46. ZMI must submit a revised reclamation monitoring plan to the agencies within 120 days of issuance of this decision that provides for monitoring of surface reclamation performance. This monitoring plan must include methods and techniques that will be used to monitor the performance of the reclamation covers, revegetation success and permanence, and erosion control measures. The plan must provide that reclaimed areas will be visually monitored for rilling, gullying, and excessive erosion which endangers the overall performance of the reclamation objectives. The monitoring program must include response actions that would be taken should monitored soil loss exceed 2 tons per acre per year, or should excessive rills or gullies develop (see Stipulation 18). The monitoring program must include yearly surveys of revegetation conditions until the agencies have approved final closure and released the mine reclamation bond.

This monitoring program is needed to track actual performance of the reclamation with the stipulated reclamation objectives. It provides an evaluation mechanism to determine when release of the reclamation bond is appropriate and to identify reclamation problems that need remediation.

47. ZMI must monitor operation of the LAD areas according to the approved monitoring plan.

Monitoring of land application is required to prevent over application of solutions beyond the ability of the soil profile to attenuate.

48. ZMI must provide final engineering "as built" reports for the backfilled Zortman pit/waste rock repository and the backfilled Landusky pit/Montana Gulch construction to the agencies within 180 days after completion of construction of such facility.

These reports are to verify that the facilities have been constructed as permitted and meet applicable stability requirements.

49. ZMI shall provide DEQ with securities having a stated value at maturity in 2017 of $15 million (US $) according to the following schedule:

On or before October 22, 1996, permitted securities with a stated value at maturity of not less than 3.3 million dollars ($3,300,000); [paid]

On or before October 22, 1997, permitted securities with a stated value at maturity of not less than 3.2 million dollars ($3,200,000); [paid]

On or before October 22, 1998, permitted securities with a stated value at maturity of not less than 3.0 million dollars ($3,000,000);

On or before October 22, 1999, permitted securities with a stated value at maturity of not less than 2.8 million dollars ($2,800,000);

On or before October 22, 2000, permitted securities with a stated value at maturity of not less than 2.7 million dollars ($2,700,000);

For purposes of this stipulation, permitted securities are United States Treasury zero coupon bonds with maturity dates between January 1 and December 31, 2017, and agency zero coupon bonds that are backed by the full faith and credit of the United States and that have maturity dates between January 1 and December 31, 2017. ZMI may comply with this stipulation by placing these securities in trust for the benefit of DEQ in accordance with this schedule, provided that the terms of the trust are acceptable to DEQ.

For the purposes of documenting that the conditions for termination of the trust have been met, ZMI must continue geochemical monitoring to the extent necessary to document that geochemical rates of change have stabilized for 10 or more years, in the specific facility being evaluated, following correlation with regional climatic data. During this time period, captured untreated waters must comply with appropriate state and federal water quality standards. The 10-year requirement may be modified by the agencies if modeling of climatic data indicates a more appropriate hydrologic cycle should be used to assess long-term compliance.

This stipulation is to ensure the establishment of a trust fund for any long-term water treatment that may be necessary to comply with the water quality standards.

Implementation

These decisions are effective upon signing of the Operating Permit Amendments and the approval of the Plans of Operations by DEQ and BLM, respectively. Surface disturbance required to quarry reclamation materials may begin upon receipt by DEQ of the reclamation performance bond.

Approval of the modified Plans of Operations for the Zortman and Landusky mines by BLM does not constitute a determination regarding the validity or ownership of any unpatented mining claim involved in the mining operations. Similarly, approval of the permit amendments by DEQ and BLM does not convey or create any real property rights or use rights.

These approvals do not constitute authorization to discharge pollutants to state waters as defined in the Montana Water Quality Act, Title 75, Chapter 5, nor do they authorize a mixing zone as defined in ARM Title 17, Chapter 30. Those require separate authorizations from DEQ.

ZMI is responsible for obtaining any property rights, easements, mineral rights or water rights necessary to implement the selected alternative. ZMI is responsible for obtaining any other local, state or federal permits, licenses or reviews that may be necessary to implement the selected alternative.

The limestone that is to be quarried for construction and reclamation purposes is not a locatable mineral under the United States Mining Laws, but is a common variety material. ZMI must complete a mineral material sale contract with the BLM for the limestone on public lands at both the Montana Gulch and LS-2 limestone quarry sites where the right to use that common variety material is determined not to be provided for under the Mining Law. While the EIS does address the environmental impacts of limestone mining, this material may need to be obtained by purchase from the United States.

During implementation of this decision, the operator may propose waivers, exceptions, or modifications to the mining and reclamation plans, and associated stipulations or conditions. Such changes may be appropriate to provide for the use of alternate mitigation technologies that could be developed in the future, or to respond to an improved understanding of site conditions gained through operational experience.

Any change proposed to the operating procedures, scheduling, reclamation design, or mitigating measures will be reviewed by the agencies and accepted if it were to provide equal or greater resource protection than the original requirement, and does not result in significant impacts previously unidentified in the EIS. Proposed changes which would not achieve the same level of

resource protection, or would result in previously undisclosed significant impacts, would require supplemental analysis under NEPA and MEPA prior to determining their acceptability.

Reclamation Bond

A reclamation bond is to be posted and maintained at a level adequate for the agencies to implement the reclamation plans as stipulated above should ZMI be unable or unwilling to do so. The reclamation bond amount will be calculated based upon the requirements of the selected alternative. This includes costs associated with the Water Quality Improvement Plans in Appendix A of the Final EIS and the Compliance Plan agreed to in the Consent Decree. The reclamation bond may be incrementally posted or released to reflect stages of mine development and performance of concurrent reclamation requirements, but shall always remain at an amount adequate to pay for the reclamation of any disturbances that may exist. The entire reclamation cost estimate will be reviewed and adjusted by the agencies at least every 5 years to account for changes in reclamation costs and inflation.

These calculations will be available from DEQ or BLM once complete. The reclamation bond amount is subject to change should more detailed cost information become available. The reclamation bond does not represent the limits of the operator's liability should actual reclamation performance not meet the requirements in the reclamation plan or comply with environmental laws.

Issues and Alternatives

Public Scoping and Comment

Extensive public involvement efforts were used for EIS scoping and during the Draft EIS comment period to identify and address relevant environmental issues. A Notice of Intent, formally announcing the beginning of the EIS process, was published in the Federal Register in November 1992. The public has been informed of, and involved in, the EIS process through additional Federal Register notices, news releases, direct mailings, and public meetings. Throughout the process, briefings were held with interested publics, the Fort Belknap Community Council, the Phillips County Commissioners, State Legislators and Congressional staffs.

To identify issues and concerns associated with the proposed action, public scoping meetings were conducted in the following communities:

- Dodson, December 15, 1992 (26 people attended)
- Malta, December 16, 1992 (39 people attended)
- Hays, December 17, 1992 (27 people attended)
- Lodgepole, April 15, 1993 (30 people at the afternoon meeting) (75 people at the evening meeting)

Advance notification of the meetings was provided through press releases, mailed notices, and public service announcements. Copies of ZMI's application were available in Harlem, Malta, Lewistown, Billings, and Helena for public review and summaries of the proposal were provided to the mailing list.

In November 1993, an environmental assessment on corrective measures for the Landusky Mine was released for public comment and a public meeting was held in Dodson, Montana. In March 1994, the agencies decided to combine analysis of the Landusky Mine corrective measures with the Zortman Mine EIS process. In April 1994, a Federal Register Notice was published and a letter that formally expanded the scope of the EIS to include the mining plans and modified reclamation plans at both mines was sent to the public.

Oral and written comments were used to prepare the Public Scoping Issues Report (October 1993) for the Zortman Mine Expansion EIS, and the Report Addendum (May 1994) for the Landusky Mine.

On August 18, 1995, the Draft EIS was issued for the *Zortman and Landusky Mines Reclamation Plan Modifications and Mine Life Extensions*. The Draft EIS presented seven alternatives including the no action alternative, the agencies' preferred alternative (Alternative 7) and the company proposed action (Alternative 4). The Draft EIS disclosed the affected environment and

the environmental consequences of each alternative.

The Draft EIS was issued with an invitation to interested parties to submit oral and written comments. Approximately 400 copies of the Draft EIS were distributed to the public and other federal and state agencies. The public comment period on the Draft EIS extended from August 18, 1995, through November 1, 1995.

Five open houses/public hearings were held in the following communities to receive oral and written comments on the Draft EIS:

- Medicine Bear Lodge in Lodgepole, September 18, 1995
  (129 people attended with 47 speakers),
- John Capture Center in Hays, September 19, 1995
  (153 people attended with 40 speakers),
- Guard Armory in Malta, September 20, 1995
  (186 people attended with 22 speakers),
- Community Hall in Landusky, September 21, 1995
  (108 people attended with 14 speakers), and
- East Middle School in Great Falls, September 26, 1995
  (280 people attended with 77 speakers)

Prior to the beginning of each hearing (except for the meeting in Great Falls) there was a 2-hour open house where the EIS Team specialists (geologists, hydrologists, mining engineers, archaeologist, wildlife biologists, and reclamation specialists) answered questions about the EIS and discussed the project impacts with the public. During the hearing, speakers were given 5-minutes to make comments. Individuals that exceeded 5-minutes were allowed additional time to continue their remarks after all speakers had been given an opportunity to comment. All participants were encouraged to submit written comments. These meetings were also a forum for the Army Corps of Engineers to collect public comments on ZMI's 404(b)(1) permit application for the Zortman and Landusky mine expansions and for DEQ to collect comments on the 401 certification. Written transcripts of the meetings were compiled in order to address and respond to comments in the Final EIS. In addition, 368 written comment letters were received by the agencies on the Draft EIS.

Concurrent with public involvement during EIS preparation, were public involvement efforts under Section 106 of the National Historic Preservation Act to identify and consider the effects of the undertaking on historic properties eligible for listing on the National Register of Historic Places. This process focused on the Little Rocky Mountains as a Traditional Cultural Property due to its association with Native American traditional cultural values and practices. Also,

consultation under the American Indian Religious Freedom Act was conducted to collect and consider the views of Native Americans. Public involvement included soliciting input from Native Americans regarding location and frequency of use of religious sites, and suggestions for mitigation of impacts to traditional cultural locations and practices. Many one-on-one discussions between BLM and Native American traditionalists were conducted. Often this included field visits to sites/areas of cultural significance. Direct input was solicited by BLM from tribal elders, traditionalists and political leaders. Over 50 individuals were interviewed for an ethnographic study used in EIS preparation. In addition to the five public meetings held on the Draft EIS, nine public meetings were held specifically to discuss the Little Rocky Mountains as a Traditional Cultural Property and to develop mitigation for impacts to traditional cultural resources. In July 1995, staff from the Advisory Council on Historic Preservation toured the project area and attended three of the meetings held to receive public input on a draft Programmatic Agreement.

All written and oral comments received on the Draft EIS were reviewed and considered in preparation of the Final EIS. Many of the comments tended to be polarized with those supporting additional mining urging selection of Alternative 7, and those opposed to mining asking that Alternative 3 be selected. Comments that presented new data, questioned facts or analysis, or raised questions or issues bearing directly upon the alternatives or environmental analysis are responded to in Sections 6.1 through 6.17 of the Final EIS. Comments expressing personal opinions or statements were considered but not responded to directly. The EPA Notice of Availability for the Final EIS was published in the Federal Register on April 5, 1996. The Record of Decision selecting Alternative 7 was signed on October 25, 1996.

In 1998, after Pegasus Gold filed for bankruptcy and cancelled the expansion plans, the agencies consulted with the various stakeholder groups regarding mine closure. The groups consulted with included technical and legal representatives from the Fort Belknap Community Council, the Island Mountain Protectors, Indian Law Resource Center, the National Wildlife Federation and the Montana Environmental Information Center. The agencies explained to these groups that, in light of the bankruptcy and cancelled expansion plans, the agencies intended to reissue the Record of Decision and select Alternative 3. The agencies then worked with the groups' technical specialist to familiarize them with the provisions of Alternative 3.

Issues and Alternatives Development

A complete description of the issues identified through the public involvement process is presented in Section 1.7 of the EIS. A summary of the issues and concerns identified by the public which have been addressed in the EIS includes:

- Impacts to Native American traditional cultural values
- Protection of cultural resources
- Water quality and water supply concerns
- Acid rock drainage issues

- Wildlife protection and mortalities
- Protection of vegetation and wetlands
- Soil characteristics and reclamation issues
- Impacts to geology and mineral resources
- Noise and air quality issues
- Socioeconomic concerns
- Recreational issues and concerns
- Visual and aesthetic impacts and concerns
- Concerns regarding land use and recreation
- Safety hazards from transportation of hazardous materials
- Concerns with effects on human health
- Engineering concerns and potential impacts to human health and environment
- Environmental policy and planning issues
- Possible alternatives to the proposed action

The issues are grouped in six general categories: ARD/Water Resources, Soil and Reclamation, Wildlife, Wetlands, Native American Traditional Cultural Values, and Socioeconomic Considerations. A description of how the significant issues were used in the development of alternatives is presented below.

ARD/Water Resources

Existing and potential future water quality problems at the mines, and the litigation regarding compliance with the Montana Water Quality Act and the Federal Clean Water Act is a significant issue. Compliance with these acts is a statutory requirement under any alternatives that are developed. There are different approaches available that may be used to promote protection of water quality and achieve compliance with the water quality laws. These formed the basis for alternative development.

The main water quality issue is degradation caused by acid rock drainage (ARD). There are three possible approaches to mitigating ARD; these are: 1) control of the acid generation process, 2) control of migration of acid drainage, and 3) the collection and treatment of acid drainage. The first two are collectively termed "source control." The third is called "capture and treatment" or "active treatment." Alternative degrees of reliance upon either source control, active treatment, or combinations of the two, were considered in the EIS. Approaches to classification of mine material as to its acid-generating potential, sorting and placement of this material, management of runon and runoff waters, types of reclamation covers and the location and design of water capture and treatment facilities were all factors used to develop alternatives that addressed water quality concerns.

Soil and Reclamation

The agencies had previously determined that the existing surface reclamation plans were inadequate for materials with acid-generating potential. Alternatives were developed to consider possible types of reclamation covers and slope configurations necessary to (1) limit the loss of cover soil due to erosion, (2) enhance revegetation, (3) minimize surface disturbance, (4) facilitate drainage of runoff, (5) minimize infiltration of precipitation into the underlying mine waste (which might result in ARD), and (6) function in the long-term post-reclamation environment with minimal maintenance. Alternatives evaluated included the use of the existing reclamation covers, the use of reclamation covers proposed by ZMI, the use of modified ZMI covers, and the use of several water barrier and water balance covers developed by the agencies with the assistance of third-party consultants.

Pit backfilling for reclamation is an issue. Pit reclamation scenarios considered in the EIS range from complete pit backfilling (See EIS Section 2.2.5) to reclaiming the pits in their current configurations. Pit backfilling was included in an alternative to the extent it mitigated other environmental issues, such as the need to dispose of mine materials, the need to direct runoff away from the pit areas so as not to accumulate ponded water that would infiltrate through acid-forming material impacting groundwater, the need to cover potentially acid-generating surfaces, and the need to mitigate visual or aesthetic impacts.

Alternatives involving complete mine pit backfilling or large amounts of pit backfilling were considered in the EIS and eliminated from detailed analysis for several reasons. An economic screening showed that substantial amounts of pit backfilling would make the entire project uneconomic and hence it would not be implemented even if it was selected. It is therefore the same as one of the non-expansion alternatives which were analyzed in detail. The key technical issues in mine pit reclamation (waste rock placement, seepage water quality, and runoff control) are addressed by partial pit backfilling analyzed in Alternatives 3 through 7. It is also not technically feasible to completely backfill all mined material into the pit due to the swell factor of material once mined and the inability to replicate pre-mining slope configurations that are stable. In addition, there are increased environmental impacts associated with complete pit backfilling such as added dust and dust suppressant use, exhaust, noise, and fuel consumption from backfill equipment operation, and increased potential for public safety concerns with traffic through Zortman. For these reasons alternatives involving large amounts of pit backfilling were not considered to be reasonable alternatives to the proposed action and were not analyzed in detail.

Wildlife

Significant issues associated with wildlife included possible impacts to the bats of Azure Cave, wildlife and migratory bird mortality by process solutions, disruption of big game migration routes, and loss of habitat. The following alternatives address these issues.

Alternative 5, which relocates the leach pad and does not include use of a conveyor for ore transportation has been included in the EIS in order to address possible disruption of Bighorn Sheep migration, to avoid impacting a water source used by bats and other wildlife, and to avoid the Azure Cave area. Other alternatives considered include mitigation such as replacement of what is possibly a primary water source for bats and other wildlife that would be disturbed by leaching on Goslin Flats.

Netting and fencing of open cyanide solution to prevent wildlife and migratory bird mortality is contained in the Company Proposed Action. No alternative wildlife control technologies for these facilities were considered in the alternatives because application of the proposed mitigation reduced wildlife impacts to insignificant.

The limiting wildlife habitat factor in the Little Rocky Mountains is the lack of forage found in open parks and meadows. Alternative reclamation plans which focus on enhancing open parks and meadows in a post-mining environment have been considered. This involves limiting the amount of trees used in revegetation and emphasizing grasses, forbs, and shrubs.

Wetlands

Issues associated with disturbance and placement of fill by past, present and possible future mining operations in waters of the U.S. were used to develop alternatives. Alternatives that involve replacement of wetlands in the Goslin Flats area at various locations are considered. Alternatives that involve restoration of areas impacted by historic mining, as compensation for mine impacts to waters of the U.S., were also included in the EIS. An alternative (Alternative 5) which involves negligible additional disturbance of wetlands for mine expansion was included. An Aquatic Ecosystem Mitigation Plan has been included in the Final EIS (Appendix F) to address all past, present and potential future impacts (both direct and indirect) to wetland and non-wetland waters of the U.S.

Native American Traditional Cultural Values

Issues related to Native American traditional cultural values include the effects of mining on the Little Rocky Mountains which are eligible for listing on the National Register of Historic Places as a Traditional Cultural Property. In addition, Traditional Native Americans regard the Little Rocky Mountains as sacred. Practices such as vision questing, sundances and gathering of traditional plants occur in the range. On-the-ground inventory and consultation with Native Americans did not reveal any specific religious sites or gathering areas that would be directly impacted by the proposed action. Still, the Little Rocky Mountains as a whole are considered sacred, and any mining activity is regarded by some individuals as desecration which cannot be mitigated.

In addition to the mandatory No Action Alternative, non-mine expansion alternatives have been formulated, in part, to respond to this issue. These alternatives consider various approaches to final reclamation of existing mine facilities without any additional mine expansion. Other expansion alternatives include mitigating measures which address impacts to resources that contribute to the sacredness of the Little Rocky Mountains. These include measures to limit disturbance extent, limit visual intrusion, improve water quality, and promote long-term reclamation success.

Since some individuals consider mining by any means as a desecration that cannot be mitigated, there are no mine expansion alternatives that would completely resolve this issue. However, alternatives that address the environmental components of air quality, water quality, vegetation, wildlife, etc. which contribute to the sacredness of the Little Rocky Mountains have been developed. A Programmatic Agreement (FEIS, Appendix E) under Section 106 of the National Historic Preservation Act has been developed that includes measures to mitigate impacts to the Traditional Cultural Property by preservation of historic and traditional associations through recordation. This mitigation is part of the mine expansion alternatives. This Programmatic Agreement also provides mitigation to the historic mining sites and an archaeological site that would be impacted by the expansion alternatives.

Social and Economic Considerations

Concerns expressed by the public over both the environmental degradation and the loss of economic benefits from mining were used in the development of alternatives.

Alternatives are considered that involve no additional mining and focus on reclaiming the existing impacts of mining in the Little Rocky Mountains. These alternatives address the concerns of those who feel that the environmental effects of mining in this area are not acceptable.

Conversely, alternatives which provide for expanded mining have been developed. This addresses the concerns of those who feel that the environmental impacts of mining are acceptable in exchange for the continued economic benefits. These alternatives also recognized the mineral development rights of the landowners and mining claimants.

Alternatives which attempt to balance mineral development needs and rights with environmental protection requirements have been developed. These alternatives involve some of the more intensive applications of mitigating measures, yet would allow for expanded mining. These include alternative facilities locations, improved plans for reclamation, set performance criteria, offsite mitigation and enhanced water management.

Alternatives Considered in Detail

A summary of the alternative project components considered, and the rationale for their inclusion or exclusion from detailed analysis, is presented in Table 2.2-1 of the Final EIS. The following seven alternatives were retained for detailed analysis in the EIS:

Non Mine Expansion Alternatives

Alternative 1: No Action, Existing Reclamation Plans

Alternative 2: ZMI Proposed Modified Reclamation Plans

Alternative 3: Agency Mitigation Added to ZMI Proposed Modified Reclamation Plans

Mine Expansion Alternatives

Alternative 4: ZMI Proposed Mine Expansions and Modified Reclamation Plans, *Company Proposed Action*

Alternative 5: Mine Expansions and Modified Reclamation Plans With Agency Mitigation, *New Leach Pad in Upper Alder Gulch*

Alternative 6: Mine Expansions and Modified Reclamation Plans With Agency Mitigation, *Zortman Waste Rock Disposal at Ruby Flats*

Alternative 7: Mine Expansions and Modified Reclamation Plans With Agency Mitigation, *Zortman Waste Rock Disposal Site Overlies Existing Disturbances*

Chapter 2 of the Final EIS contains a complete description of these alternatives. Tables 2.2-2 and 2.2-3 in the Final EIS summarize the major components of each of the seven alternatives. Table 2.3-1 in the Final EIS summarizes the environmental impact of the seven alternatives.

Environmentally Preferred Alternative

Alternative 3 is the environmentally preferred alternative. This alternative, as well as Alternatives 1 and 2, would avoid the impacts associated with expanded mining operations. In addition, Alternative 3 would utilize reclamation measures to restore lands that have been disturbed by past mining. These reclamation measures are superior to those contained in Alternatives 1 or 2 and would result in long-term reclamation success.

Rationale for the Decisions

Alternative 7, the preferred alternative identified in the Final EIS, is no longer viable because of Pegasus Gold's decision to cancel plans for additional mining at the Zortman and Landusky Mines. Alternative 3 has been selected by the agencies for implementation in place of Alternative 7. A non-mine expansion and reclamation alternative has been chosen to address the need for reclamation of the existing disturbance in accordance with private property rights, public land law, and agency land use plans. All practical means to avoid or minimize environmental harm have been included in the selected alternative. Modified reclamation covers have been selected to enhance the potential for long-term reclamation success and reduce the potential for surface water to infiltrate into reclaimed facilities. These measures, together with other mitigation, are used to address existing environmental problems, prevent unnecessary or undue degradation, and provide for comparable stability and utility of mined lands with adjacent areas.

How the Selected Alternative Addresses the Issues

ARD/Water Resources

Alternative 3 has been selected because it includes an optimal combination of source control to prevent contamination from developing, migration control to limit the movement of degraded water, and water capture and treatment to supplement the first two control measures. This multiple approach to water quality management has greater reliability than use of a single mitigation technique and reduces the need for long-term maintenance after mine closure.

The geochemical criteria for identification of non-acid generating rock have been developed based upon the analysis of thousands of geochemical tests (Final EIS, Section 3.2.2). The multiple geochemical criteria in the selected alternative decrease the chances of misclassification of material compared to use of a single criterion as proposed in Alternative 4, the Company Proposed Action. These criteria provide for the identification of rock with low risk of acid formation and provide for accurate identification of material suitable for use in reclamation. Equally important, these criteria provide for identification of material with moderate to strong acid-forming potential. Such material is then selectively placed to limit its ability to acidify at a rate which would release unacceptable levels of contaminants to area waters. While little new material will be mined under Alternative 3, these criteria will be useful to direct placement of relocated waste rock and spent ore, and for identification of suitable material for use in the reclamation covers.

Migration of acid products formed within mine waste is limited by the amount of water that enters the waste and thus is available for flushing of reaction products. Water availability is minimized by diverting runon water away from disturbance areas, and by construction of surface reclamation covers which provide long-term stability and promote evapotranspiration of precipitation, thus limiting infiltration. The reclamation covers under Alternative 3 provide the maximum protection from infiltration through promotion of evapotransporation and improved stability.

Redistribution of waste rock and spent ore decreases the surface area available for recharge and reduces the number of discharge points that potentially require capture and treatment. Seepage which does discharge from reclaimed mine waste units will be collected and controlled using recovery wells, holding ponds, and other capture systems. This seepage will then be treated, if necessary, to meet the effluent limitations in the discharge permits, and released.

By using this system of mine waste isolation, restriction of water infiltration, and seepage capture and treatment, the majority of mine waste water will be captured and treated, thus water quality standards will be met. Though there is always the possibility of a system upset or failure, the risk to water resources is minimal, and the approach is reasonable and prudent.

These same mitigation technologies also minimize the potential for impacts to groundwater. ARD discharges to groundwater are minimized by diverting runon waters, limiting infiltrating waters, and preventing the release of untreated water to surface drainages that may recharge the groundwater systems.

Adequate information regarding water resources has been an issue. It must be noted that although a groundwater study is included in the recent settlement of water quality litigation in order to resolve the lawsuit, this additional groundwater information is not needed to make a decision regarding the reclamation and mine expansion plans. The thousands of water quality analyses collected from the hundreds of monitoring sites over the past 17 years have provided adequate information on groundwater resources for the agencies to characterize resource conditions, evaluate alternatives, assess potential impacts, and develop mitigation. In fact, the work done to date on the groundwater study required under the consent decree has verified the conclusions made in the EIS regarding groundwater. The only additional groundwater data requirements identified are for the purpose of monitoring potential impacts.

The current groundwater system beneath the mine pits discharges mainly to the south. Data collected from the groundwater and surface water monitoring stations since modern mining began does not show significant groundwater contamination migrating northward and discharging in northern drainages. Though expansion of the mine pit at Zortman will not occur under Alternative 3, additional surface and ground water monitoring north of the pit area is warranted to verify that groundwater contamination has not occurred in the northern drainages. These monitoring well and stations were put in place during 1996 and 1997.

The selected alternative does not result in significant reductions in flow volumes in drainages which eventually enter the Fort Belknap Indian Reservation. Concurrently, this alternative protects water quality in northern drainages by relocating the limestone quarries south of the divide and routing all post reclamation runoff from the mine pits to southern drainages.

Soil and Reclamation

Alternative 3 has been selected because this alternative provides for a reclamation cover with long-term stability. Relocating waste rock and spent ore over or within an existing disturbance, the selected alternative will limit the distibution of reclamation materials to a smaller area, allowing for thicker cover construction which will promote reclamation success. Relocation of waste rock and spent ore confines water management to a smaller area and thereby promotes operational efficiencies and limits the number of potentially affected drainages should an undesirable event occur.

The reclamation cover designs in the selected alternative are superior to those originally proposed for several reasons. One reason is that no compacted clay is used in construction of the selected reclamation covers. The long-term permeability of clay can increase due to damage from freeze-thaw cycles and desiccation cracking due to drying, allowing infiltration of water into the underlying mine waste. The use of the geosynthetic clay layer (GCL) in the selected alternative, instead of compacted clay, requires less intensive quality control measures during installation and is not as susceptible to frost damage or desiccation. The GCL does not require clay mining in the immediate vicinity. This avoids cumulative dust, noise, and exhaust emission impacts associated with the thousands of haul trips to deliver the clay. It also alleviates safety concerns associated with hauling clay through the communities of Zortman and Landusky.

The selected reclamation covers use a thicker agricultural layer. This will promote long-term revegetation success and lower soil loss rates. The 2-ton per acre per year soil loss limit and the 90 percent revegetation cover requirement will ensure a stable reclamation surface suitable for return to natural plant succession processes. The lower slope angles with constructed benches improve the overall stability of the reclaimed facility and reduce potential for rilling or gullying which can breach reclamation covers.

The spread of noxious weeds will be controlled. ZMI has a Noxious Weed Control Plan approved by Phillips County in 1991 (See Appendix 15, ZMI Plan of Operations).

Wildlife

The BLM consulted with the U.S. Fish and Wildlife Service (FWS) on its biological assessment for Alternative 7. The FWS concurred with the determination of no adverse effect to the species identified (bald eagle, peregrine falcon, black-footed ferret, and piping plover), and notified the BLM that formal consultation would not be required on mine expansion. The selection of Alternative 3 eliminates many of the potential impacts to wildlife that would have occurred under Alternative 7; and therefore it also has no adverse effect to the species identified (see Biological Assessment, Final EIS, Appendix C).

Since a limiting factor for wildlife in the Little Rocky Mountains is lack of forage found in open parks and meadows, the selected alternative will not utilize tree seedlings for general reclamation. Revegetation will consist primarily of grasses, forbs and shrubs to improve wildlife habitat. The post-reclamation vegetation may eventually attain a higher wildlife value than was the pre-mining value.

Wetlands

The selected alternative includes mitigation plans to replace and restore past and present wetland and non-wetland waters of the U.S. which have been impacted by mining activity.

Native American Traditional Cultural Values

Alternative 3 will have the least amount of adverse impacts to Native American traditional cultural resources and practices. Many of the Native Americans that commented during the EIS process favored Alternative 3. However, it must be recognized that due to past mining activity residual impacts to the Little Rocky Mountains as a sacred landform are unavoidable.

Consultation under Section 106 of the National Historic Preservation Act (NHPA) has been completed for all alternatives with the State Historic Preservation Office, the Advisory Council on Historic Preservation and the interested parties. The Advisory Council on Historic Preservation signed a Programmatic Agreement in November 1995 along with the BLM, SHPO, and ZMI. This constitutes completion of the requirements of Section 106 of the National Historic Preservation Act. The Programmatic Agreement is contained in Appendix E of the Final EIS. The Programmatic Agreement includes Treatment Plans for historic properties, including Native American Traditional Cultural Properties, an archaeological site, and historic mining properties to be implemented if a mine expansion alternative is selected. Since Alternative 3 does not provide for mine expansion, no treatment plans are required to be implemented. If previously undiscovered cultural resources are encountered during the course of reclamation, ZMI must notify the BLM, DEQ, and the State Historic Preservation Office and not proceed until the agencies give approval.

The Programmatic Agreement was developed in consultation with the interested parties. Specific input from Native Americans was elicited regarding location and frequency of use of religious sites and suggestions for mitigation of impacts to traditional cultural locations and practices.

Attempts by BLM and staff from the Advisory Council on Historic Preservation to ask for suggestions as to "what would make the totally unacceptable (mining) even slightly less unacceptable" received only minimal response. The only satisfactory "mitigation" in the view of some individuals consulted is not to approve the mining, which is consistent with implementation of Alternative 3.

In conjunction with consultation under the NHPA, consultation under the American Indian Religious Freedoms Act (AIRFA) has also been completed. While the entire mountain range is regarded by Traditional Native Americans as sacred, no specific sites (vision quest sites, graves, sacred plant gathering areas, etc.) were identified that will be directly affected by mine reclamation activities. Mining in the Little Rocky Mountains is regarded as desecration and cannot be mitigated in the view of some individuals, even with reclamation. Thus, the agencies are unable to reduce impacts to Native American traditional cultural resources to less than significant from activities that have already occurred, even with the improved reclamation plans under Alternative 3.

Alternative 3 offers some relative advantages when compared to the other reclamation alternatives. It provides the greatest probability for long-term reclamation success, avoids potential impacts to water resources by routing runoff from mine areas to the south and away from the Reservation, and has the least amount of visual impacts.

Social and Economic Considerations

Since Pegasus Gold has decided not to proceed with its mine expansion plans it must undertake reclamation of areas already disturbed by past mining. This alternative provides the greatest potential for successfully returning the land to productive use. Other social and economically important land uses, such as wildlife habitat and recreational use, can occur on these lands.

The selected alternative satisfies the individual concerns of many who feel that the environmental effects of mining are not compatible with other land uses.

Management Rationale for the Selected Alternative

This section provides the management rationale used to select the alternative for implementation. It is not intended to be exhaustive as to all applicable management constraints, but is intended to explain how the selected alternative satisfies the agencies' major legal, regulatory, and policy mandates.

National Mineral Policy Conformance

The Mining and Minerals Policy Act of 1970, the Federal Land Policy and Management Act of 1976 (FLPMA), and the Natural Materials and Minerals Policy, Research and Development Act of 1980 direct that the public lands be managed in a manner which recognizes the Nation's need for domestic sources of mineral production. Under the Mining Law of 1872 claimants have a statutory obligation to perfect their claims and a right to develop their mineral deposits consistent with applicable environmental laws.

The selected alternative provides for the reclamation and closure activities necessary to comply with applicable environmental laws regarding water quality and reclamation at the Zortman and Landusky mines.

Prevention of Unnecessary or Undue Degradation

Section 302(b) of FLPMA amended the Mining Law of 1872 and directed the Secretary of the Interior to: "...prevent unnecessary or undue degradation of the lands." Unnecessary or undue degradation was defined in the implementing regulations at 43 CFR 3809 as: (1) surface disturbance greater than what would normally result when activity is being accomplished by a prudent operator in usual, customary, and proficient operations of similar character; (2) failure to take into consideration the effects of the operations on other resources and land uses, including those resources and uses outside the area of operations; (3) failure to initiate and complete reasonable mitigation measures, including reclamation of disturbed areas or creation of a nuisance; and (4) failure to comply with applicable environmental statutes and regulations.

The selected alternative addresses the first requirement by reducing surface disturbance through removal of certain waste rock dumps and consolidation into a smaller area where they can be managed more efficiently with regards to revegetation, drainage control and seepage capture. Conducting mine reclamation under the selected alternative will therefore satisfy the prudent operator requirement.

The selected alternative addresses the second requirement by taking into consideration the effects of the operations on other resources and land uses. The selected alternative includes measures to reduce or avoid impacts to water resources, air quality, wetlands, soils, vegetation, wildlife, visual resources, cultural resources, and social concerns. These measures are described in detail in Chapter 2 of the Final EIS and in the mitigation stipulated as part of this alternative. A brief description follows.

Water resource concerns are addressed by avoiding drainage to the north which is a concern to the residents of the Fort Belknap Reservation, by selective handling of waste rock with acid generating potential, by implementation of the Water Quality Improvement Plan (EIS Appendix A) and the Compliance Plan (from the Consent Decree), and by increased monitoring. These requirements ensure that water quality, quantity, and use are adequately protected.

Air quality effects are considered by limiting truck traffic so as to keep emissions within standards. Monitoring of air quality inside and outside the area of operations is to be continued.

Wetland and non-wetland waters of the U.S. are considered by requiring restoration of existing impacted drainages and construction of replacement wetlands.

Soils and vegetation are considered through use of improved reclamation plans which provide

reclaimed areas with long-term stability. Thus, post-mining land uses are adequately protected.

Wildlife concerns are addressed by measures such as fencing and netting used to prevent wildlife mortality in process and capture ponds. The revegetation seedmix is focused on improving wildlife forage in the reclaimed area.

Visual resource effects are considered by selectively using trees for screening of disturbed areas at reclamation, and by recontouring facilities to meet VRM Class II criteria where it does not interfere with the primary reclamation objectives.

Alternative 3 has the least impact on historic properties. This includes impacts to traditional cultural properties utilized by Native Americans and historic, non-Native American, properties.

Adverse social effects are addressed by limiting the number and speed of haul truck trips through the communities of Zortman and Landusky. Thus, nuisance effects have been reduced.

Based on the above, the selected alternative satisfies the second requirement for preventing unnecessary or undue degradation by taking into consideration the effects of the operations on other resources and land uses and adopting reasonable mitigations to address the effects.

The selected alternative addresses the third requirement of FLPMA regulations to include reasonable mitigation for adverse impacts by requiring reclamation of lands disturbed by mining. Mitigation is used to reduce most impacts to less than significant. (Table ES-11, Final EIS)..

The Final EIS has determined that the reclamation plans in the selected alternative will be highly successful at re-establishing natural plant and soil succession in the disturbed areas, at limiting long-term infiltration of precipitation into mine waste, and at maintaining stability of the reclaimed surfaces. These reclamation plans meet Montana and federal requirements, and meet or exceed the performance requirements for reclamation covers used not only elsewhere in the mining industry, but in the hazardous waste/landfill sectors as well. For these reasons the selected alternative satisfies the third requirement for preventing unnecessary or undue degradation by including reasonable mitigating measures and addressing reclamation of disturbed lands.

The selected alternative addresses the fourth requirement for preventing unnecessary or undue degradation by including measures needed to comply with applicable environmental laws and regulations--specifically, measures to ensure compliance with the water quality laws and wetland protection.

The selected alternative includes measures necessary to address causes of past violations of the Montana Water Quality Act and the Federal Clean Water Act. The selected alternative also includes requirements for ZMI to obtain the necessary N/MPDES permits. These plans are presented in Appendix A of the Final EIS and in the Compliance Plan under the Consent Decree entered on September 27, 1996.

Source controls to limit the generation of ARD from mined materials are included in combination with water monitoring, water capture, and water treatment measures under the selected alternative. These measures provide the means necessary for operations to meet water quality standards Since the selected alternative includes plans judged to be adequate for achieving and maintaining compliance with the water quality laws, the selected alternative satisfies the fourth requirement for preventing unnecessary or undue degradation.

In conclusion, the modified reclamation plans for the Zortman and Landusky mines in the selected alternative satisfy the requirements of the Federal Land Policy Management Act and will not result in unnecessary or undue degradation. In fact, the longer reclamation is delayed the greater the potential for causing unnecessary or undue degradation to occur. It is, therefore, imperative that this decision be implemented immediately.

Land Use Plan Conformance

The majority of public lands in the Little Rocky Mountains are open to operation of the Mining Law in conformance with the Judith-Valley-Phillips Resource Management Plan/EIS. This includes public lands in the mining area. The selected alternative is consistent with the Hardrock Mineral Resources Reasonably Foreseeable Development Scenario presented and analyzed in Appendix C of the Resource Management Plan. Selection of an alternative which involves only mine reclamation and closure does not preclude future mineral exploration or development. Future mining plans could still be approved provided they do not cause unnecessary or undue degradation.

Since Alternative 3 is needed to prevent unnecessary or undue degradation and meets all other agency planning and management objectives, it is selected for implementation and the modified Plans of Operations are approved.

Executive Order 12898 on Environmental Justice

On February 11, 1994, President Clinton signed Executive Order 12898 that requires federal agencies to address environmental justice issues when implementing their respective programs. The Order directs the Department of the Interior to take the lead role in coordinating environmental justice issues associated with Federally-recognized Indian Tribes.

The question of Environmental Justice along with charges of "environmental racism" have been raised in connection with the mines.

Several different situations are often cited in defining Environmental Justice. The following is a summary of each:

- The targeted siting of potentially polluting facilities in areas with racial minorities or impoverished populations. The motives often attributed to the proponent are: 1) that they do not care about the affects on minority populations; and/or 2) that the site is desirable because minorities and the poor do not have the resources to oppose the project.

- Discrimination by regulatory agencies in enforcement of environmental standards where projects may be affecting low income or minority populations. The argument is that these groups cannot obtain the same level of regulatory protection as other groups that may be wealthier, more politically powerful or of a different race.

- The inequitable distribution of project benefits, primarily economic, with project impacts such as increased pollution or perceived risk of pollution.

Therefore, environmental justice considerations can be grouped into three general categories: 1) facility siting and opposition, 2) regulatory agency discrimination, and 3) equitable distribution of project benefits and risks.

The agencies have considered each of these factors in reaching the decision to approve the mine expansion and modified reclamation plans using the selected alternative. The following is a discussion of each concern.

1) Facility Siting and Opposition

Siting alternatives for mine facilities such as the ore heaps and waste rock repositories have been specifically included or excluded from consideration based on trying to avoid the potential or perceived potential for impacts to Native American communities or resources. However, the ore body is fixed by the geology, limiting any flexibility regarding the location of the mine pits.

The selected alternative minimizes potential impacts to Native American communities from mine expansion. The location of mine waste rock facilities and reclamation quarries have been structured in the selected alternative based on avoidance of disturbance in drainages that eventually flow onto the Fort Belknap Indian Reservation. Mine pits, which cannot be relocated, are to be reclaimed in the selected alternative so that runoff is directed away from the Reservation side of the mountain range and the potential for contamination is minimized.

Residents of Fort Belknap have had access to technical and legal resources to make their concerns about mining known and to participate in the permitting process. Native Americans opposed to mining have received advice and assistance from various attorneys, regional and national environmental groups, government agencies and technical professionals. They have participated in past administrative appeals before the Interior Board of Land Appeals, have been involved in litigation against the mines in both state and federal courts, and have provided testimony during the public meetings. Numerous substantive and detailed legal and technical comments were provided on the Draft EIS from both government and private parties on behalf of the Fort Belknap

residents.

2) Regulatory Agency Discrimination

EPA, DOJ, BIA, DEQ, BLM, and the Agency for Toxic Substances and Disease Registry (ATSDR) have all devoted considerable regulatory resources to studying the mines' potential effects on Fort Belknap and to providing the residents direct access to their agency representatives. Federal and state water quality enforcement actions and site investigations have been undertaken at least in part due to the potential for impacts to water quality on the Reservation. Likewise, in 1993 the BLM and DEQ ordered that modified reclamation plans be prepared due to similar concerns.

Though the majority of environmental impacts are directed away from the Reservation, the recent settlement agreement on water quality includes requirements for construction of new water systems for Reservation communities, performance of an aquatic resources study on and adjacent to the Reservation, performance of a groundwater study, conducting a community health evaluation for residents of the Reservation and a payment of $1 million for other relief to Fort Belknap. While nothing was identified during the EIS process that required these studies in order to characterize resource conditions, evaluate alternatives, assess impacts, or develop mitigation, these measures were included in the settlement to satisfy the concerns of the parties involved.

An intensive effort has been made to provide opportunities for Native American input on mining issues. Since 1990, the agencies have held over a dozen public meetings, at least five briefings for the Fort Belknap Community Council, mine tours, numerous meetings or one-on-one visits, field trips, work groups, etc. to obtain Native American input and provide information on mining issues. Public meetings have been held in communities on or adjacent to the Reservation to promote the participation of those who may not have had access to transportation, or those who may not have been comfortable traveling to a meeting location off the Reservation.

The water resources monitoring wells and surface stations are focused on mine facilities with the potential to degrade waters. This means that most monitoring wells and surface sites are located south of the drainage divide in the Little Rocky Mountains, away from the Reservation. This is because most of the mine facilities with the potential to release contaminants are located south of the drainage divide away from the Reservation. In order to provide assurance to the people of Fort Belknap, the selected alternative includes requirements for additional surface and groundwater monitoring north of the drainage divide.

3) Equitable Distribution of Project Benefits and Risks

Any formula to establish what would constitute an *equitable distribution* of project risks and benefits would be highly subjective. However, there do not appear to have been any overwhelming imbalances either way.

The residents of Fort Belknap in Hays and Lodgepole are at less risk than non-Fort Belknap residents in the communities of Zortman or Landusky from possible environmental effects of the mines. However, Native Americans are also more susceptible to impacts to traditional cultural practices and heritage values than non-Native Americans. Disruptions related to mining, noise, dust, landscape alteration, etc. may be experienced by Native American religious practitioners in certain portions of the mountains. These "spiritual" impacts are unique to certain members of the Native American community. Statements by some individual Native Americans that these types of impacts cannot be mitigated are acknowledged. The selected alternative would not approve continued mining, therefore these impacts would not continue.

The majority of economic benefits have been directed away from the Reservation, as have been the majority of environmental impacts.

Water contamination from existing mine facilities is highest in those drainages that flow away from the Reservation through the non-Reservation communities of Landusky and Zortman. The drainages most impacted by the current mining operations are Ruby Gulch, Alder Gulch, Mill Gulch, Sullivan Creek and Montana Gulch, all of which flow to the south, away from the Reservation.

Streams emanating from the mining areas leading onto the Reservation are monitored and have been studied for potential contaminants. Results show these streams do not contain contaminant levels that would pose a human health risk. This has been verified in studies or monitoring events conducted by: The Council of Energy Resource Tribes (CERT), ATSDR, BIA, BLM, DEQ, EPA, Fort Belknap Community Council, and the USGS. Similarly, there is no evidence that there are abnormal incidents of health ailments among those populations living in proximity to the drainages leaving the mining areas. Should a higher frequency of health problems be identified in these communities, the studies and monitoring done to date suggest that the mines would not be the likely contaminant source.

Of the benefits associated with past mining, most of the jobs were held by individuals that live outside the Reservation. Conversely, the mine jobs held by those that live on the Reservation may have had a proportionally higher beneficial economic and social impact due to the lower average income on the Reservation.

In conclusion, there are no environmental justice issues relative to the Zortman and Landusky mines that violate or are inconsistent with the intent of Executive Order 12898. A primary mine facility siting criteria has been to avoid even the perception of creating environmental impacts to the Reservation. Impacts to personal religious values or beliefs are not within the scope of the environmental justice initiative and cannot be resolved through environmental justice mandates, though the selected alternative has the least impacts to such values and beliefs. The regulatory agencies have actively pursued enforcement at this site, while non-Native American communities have experienced considerable economic impacts from mine slowdowns while these enforcement actions are resolved. Finally, although the non-Native American communities have experienced

most of the environmental impacts associated with mining, they have received most of the economic benefits associated with mining.

Native American Trust Responsibilities

Department of the Interior manual part 512 requires agencies of the Department to consult with Indian tribes on a government-to-government basis whenever plans or actions effect tribal trust resources, trust assets, or tribal health and safety. Though no such affect has been identified, BLM has conducted consultation with the Fort Belknap Community Council during review and environmental analysis of ZMI's proposed mining and reclamation plans. Briefings and meetings were held with Council members similar to those held with county and state government officials.

There are no lands owned by the Tribes involved in the mining activities. Reclamation under the selected alternative (or any alternative) occurs on lands that are either private, or public lands under the administration of the BLM. Approval of the modified Plans of Operations by BLM using the selected alternative is consistent with BLM's trust responsibilities.

The EIS has analyzed the potential offsite impacts that will occur to all aspects of the human environment both on and off the Fort Belknap Reservation. The selected alternative requires compliance with all environmental laws, with special emphasis on water quality laws. The selected alternative would have no impact on trust resources that require the Department of the Interior to exercise special protective measures under its trust responsibilities to Native Americans.

Religious Freedom Restoration Act

The Religious Freedom Restoration Act of 1993 (RFRA) states that government may substantially burden a person's exercise of religion only if it demonstrates that application of the burden to the person is (1) in furtherance of a compelling government interest; and (2) is the least restrictive means of furthering that compelling governmental interest.

The compelling governmental interest in this case has been ZMI's legal right to develop the minerals which it owns or controls under provisions of the Mining Law. The selected alternative would not "substantially burden" the exercise of religion as considered under RFRA.

The Little Rocky Mountains are considered sacred by traditional Native Americans. Although specific locations of current religious use would not be physically altered by the project, mining and associated reclamation activity is considered a desecration and therefore cannot be mitigated from this point of view. Even so, the selected alternative would not in anyway prohibit or condition current religious practices. Approximately half of the lands disturbed by current mining activity are privately owned and have been for many years. Any use of these lands has therefore been at the discretion of the property owner and this will remain constant with or without

expanded mining.

American Indian Religious Freedom Act

The American Indian Religious Freedom Act (AIRFA) was passed as a joint resolution of Congress. The resolution states that it shall be the policy of the United States to protect and preserve for the American Indian the inherent right of freedom to believe, express and exercise their traditional religions, to use sacred objects and to worship through ceremonies and ritual. BLM complies with this act by consulting with and considering the views of Native Americans when a proposed land use might conflict with traditional Native American religious beliefs or practices. The act does not require that land uses be denied which conflict with Native American religious beliefs or practices.

Conflicts identified for the selected alternative include visual and audible disruption from reclamation activity of some Native American traditionalists who may be worshiping in portions of the mountains, and desecration of the sacred mountains by intrusive activities. While the entire mountain range is regarded by many Native Americans as sacred, no specific sites (vision quest sites, graves, sacred plant gathering areas, etc.) were identified that will be directly affected.

In spite of exhaustive efforts to accommodate the concerns of traditional Native Americans, the land use of mining is simply not compatible with some traditional Native American values. No mitigation to the impacts of mining through reclamation is viewed as acceptable to some people since they consider surface disturbance an act of desecration. While many portions of the mountains will continue to be conducive for religious practices, residual impacts to the Little Rocky Mountains as a sacred landform are unavoidable even with successful reclamation.

In selecting the preferred alternative it is important to acknowledge these concerns while recognizing that complete mitigation is not possible since the impact is as much spiritual as it is physical. However, it is also important to note that this decision does not limit the Native Americans' freedom to believe, express or exercise their traditional religious beliefs, their right to possession of sacred objects and freedom to worship through ceremonies and traditional rites as required by AIRFA.

This decision is consistent with President Clinton's recent executive order (E.O. 13007) requiring each agency, to the extent practicable, to accommodate access to and use of sacred sites by Indian religious practitioners, and to avoid adversely affecting the physical integrity of such sacred sites. No "sacred site(s)" as defined in the executive order, have been identified that will be disturbed by implementation of the selected alternative.

National Historic Preservation Act

BLM has completed the process for considering the effect of the undertaking on Historic Properties as required by Section 106 of the National Historic Preservation Act. The area of potential effect has been inventoried, historic properties identified, interested parties consulted, and a Programmatic Agreement developed to mitigate impacts. The State Historic Preservation Office and Advisory Council on Historic Preservation have been participants throughout this process and are signatories to the Programmatic Agreement. Signing of the Programmatic Agreement by BLM and the Advisory Council documents BLM's completes the NHPA review process and allows BLM to proceed with decision making on ZMI's proposal. Under the Programmatic Agreement, selection of Alternative 3 does not require completion of any treatment plans.

Montana Metal Mine Reclamation Act

Article IX, Section 2 of the Montana Constitution provides that the Legislature shall provide standards for reclamation of lands disturbed by mining. The Metal Mine Reclamation Act sets those standards for metal mines. To this end, the Act provides that reclamation plans must achieve a post-mining land use of comparable stability and utility as that of the premining landscape, except for open pits and rock faces that cannot be reclaimed to this standard. For those open pits and rock faces, the Act requires that the reclamation plan must achieve the criteria stated under 82-4-336(7).

The post-mining land use for the Zortman and Landusky mines is wildlife habitat. This is compatible with existing uses of the proposed expansion area as well as with land use in the area surrounding the mine. Wildlife use has been addressed previously in this document. The reclamation plans permitted under Alternative 3 will achieve this land use as described below.

Heap leach pads will be reclaimed. This includes the completion of cyanide detoxification of the heap effluent to 0.22 mg/L WAD. Due to the size of some individual facilities such as heaps and waste rock dumps, it may take longer than 2 years to complete all reclamation activities on an individual facility. However, the plan provides for effective use of personnel and equipment to achieve reclamation standards in timely fashion. Some access roads will remain in place to provide access to monitoring sites. These will be reclaimed within 2 years of the determination that monitoring related to specific access routes is no longer needed. Similarly, the water treatment plants will also be reclaimed within 2 years of the determination that they are no longer needed.

Erosion control during reclamation will be achieved consistent with ZMI's stormwater management plan. The stormwater management plan is included as Appendix B of the Consent Decree. The contours of final reclamation will effectively reduce long-term erosion to background levels. For the short term, ZMI must monitor reclamation, repair areas of excess erosion, and

modify reclamation techniques as necessary to achieve long-term stability.

ZMI's postmining contour plan includes partial backfill of pits. This will prevent accumulations of stagnant water in the area of the pits. However, complete backfill is not part of the selected alternative closure plan. Based on the Final EIS analysis on page 2-6, and on Haight, 1996, complete backfill is not feasible. Partial backfill will provide a condition that is structurally competent, affords utility to the extent feasible, and blends with the surrounding landscape. Additional discussion of pit reclamation is presented on the following page.

The closure plans adopted under the selected alternative provide for capping of potentially acid-producing materials with subsoils and neutral waste rock. This is in compliance with the MMRA standard requiring final surface of non-noxious, nonflammable, noncombustible solids.

Capping and reclamation plans for heap leaches, waste rock repositories and other areas exceed the requirement to insulate problem materials with a minimum 2-foot covering of non-acid generating, not polluting material. Coverings will be constructed with subsoils and neutral waste rock which are not susceptible to the generation of objectionable effluent. Total capping depths will be adequate to limit generation of objectionable effluent over the long term. However, at least in the short-term, collection and treatment of objectionable effluent will be necessary to ensure that they are not discharged from the reclaimed minesites.

ZMI's revegetation plan includes native, perennial grasses, forbs, and shrubs which will support postmining wildlife use and restore a dynamic ecosystem capable of ecologic succession as described in Sections 2.8.2.8. and 2.11.2.8 of the Final EIS. ZMI will control noxious weeds until revegetated species are established. Thus, disturbed sites, excepting pits, which are described below, will be returned to a level of stability and utility comparable to adjacent areas. ZMI's reclamation plans for the pit area include a commitment to mitigate or eliminate any public nuisance that may exist at closure.

Some areas in the pits which might create objectionable effluent would still be exposed under the selected alternative. While the pit floors and benches would be covered with the required 2-feet of reclamation material, areas such as the near-vertical rock faces between the benches would be left exposed. In addition, some of the older bench areas might not be safely accessible for cover placement. However, provisions have been included in the reclamation plans for capture and treatment, if necessary, of objectionable runoff from these areas. This satisfies the requirements of the MMRA pursuant to 82-4-336(5)(c), MCA.

Pit benches will be reclaimed concurrent with mining using 12 inches of NAG material overlain by 12 inches of topsoil. A grass seed mix will be used to revegetate the benches to provide wildlife habitat and to increase evapotranspiration. Pits will be partially backfilled (see Figure A-11 of the Final EIS) to reduce potential acid drainage, to prevent the accumulation of stagnant water, to provide for drainage of runoff, to reduce the volume of waste to be disposed of elsewhere, and to increase the utility of the reclaimed pits.

Pit benches will also be reclaimed to withstand climatic and geologic conditions comparable to those currently existing in the area. Should a bench or portion of pit wall slump, it would create a localized angle-of-repose slope approximating one of the many talus slopes commonly seen in the Little Rocky Mountains and thus not pose a threat to public safety and the environment. Remaining pit walls and benches would replicate many of the naturally occurring cliff-forming rock outcrops in the area. The pit walls and benches would be subject to the same environmental conditions and processes as that of the surrounding undisturbed areas. Rates of natural degradation for both disturbed and undisturbed areas are not expected to differ appreciably in the long-term. Recontouring and revegetation plans for pit benches have been designed to blend with the surrounding area to the extent feasible. Revegetation will prevent air pollution. Potential water pollution and degradation of adjacent lands will be reduced by backfilling and capping of all materials and surfaces, other than the upper pit walls, which are potentially acid generating. Water capture and treatment will prevent water pollution and degradation of adjacent lands until postmining water quality returns to background levels.

Heap leaches and waste rock dumps will be recontoured to minimize infiltration of precipitation, beyond that necessary for successful revegetation of the specified plant communities. Heap leaching facilities are lined to prevent objectionable groundwater discharges. Waste rock repositories and heap leaches will also be capped to prevent objectionable post-mining groundwater discharges.

This decision complies with the Metal Mine Reclamation Act (MMRA). This decision, through the stipulations and the plan of operations, ensures ZMI implements measures and plans to comply with the Montana Water Quality Act and the Montana Air Quality Act, both of which must be complied with in order to obtain approval under the MMRA.

Montana Water Quality Act

The reclamation plans, and water management plans selected by the agencies under Alternative 3, in combination with the water management plans specifically required under the Consent Decree, will effectively prevent the discharge of pollutants. These plans limit the generation of objectionable effluent and provide for capture and treatment of any objectionable effluent that does develop. When properly implemented these measures can be successfully used by ZMI to achieve and maintain compliance with the Montana Water Quality Act.

Montana Air Quality Act

The Department has determined that ZMI's activities would be in compliance with the Air Quality Act. The emission levels predicted, after application of the required mitigation, and after final reclamation, would not exceed the air quality standards.

Montana Hard Rock Impact Act

Mining at the Zortman and Landusky mines was permitted in 1979, which predates the passage of the Hard Rock Impact Act in 1981. Therefore ZMI is grandfathered from the need for a specific Hard Rock Impact Plan, consistent with Title 90, Chapter 6, Parts 3-4, MCA.

NEPA/MEPA Cumulative Effects Assessment

Both BLM and DEQ are required by their respective statutes, NEPA and MEPA, to assess the cumulative impacts of the proposed action and alternatives on the environment. In this case it is especially relevant since the project began in the late 1970s and much of the existing environment has already been impacted. The assessment of cumulative effects has been a major focus in the draft and final EIS. The cumulative effects of this project are described in Chapter 4 of the Final EIS for each resource component. Chapter 3 devotes considerable attention to identifying changes in water quality that have occurred since the mines began operation in 1979. The results of this cumulative effects analysis have been used to develop the selected alternative. Measures to mitigate impacts from past mining activity have been built into the selected alternative in order to minimize the cumulative impacts of the entire mining operation.

Should future mineral projects be proposed in the Little Rocky Mountains the impacts will be evaluated pursuant to MEPA and NEPA. Such analyses would be used to determine the full extent of cumulative effects prior to decision making.

Monitoring and Compliance

This section describes the project monitoring that will be conducted during implementation of the selected alternative by both the agencies and the operator. The purpose of the monitoring is to assure compliance with the approved Plans of Operations and all Operating Permit Amendments, as stipulated, and to validate the impacts predicted by the EIS.

Agency Monitoring

Agency staff from DEQ and BLM will conduct compliance inspections at the Zortman and Landusky Mines under the authority of the Metal Mine Reclamation Act and the Federal Land Management and Policy Act. Comprehensive mine-wide inspections will consist of physical onsite examination of disturbance areas, verification sampling at water quality monitoring points, and geochemical sampling of mine products, construction materials and reclamation materials. Annual examination of revegetation conditions will be conducted. Inspections more frequent than quarterly may be conducted during periods of intense activity in localized portions of the mine or where compliance problems have been noted and corrective measures are being implemented. Additional compliance inspections pursuant to the Montana Water Quality Act and the Montana Air Quality Act will also be conducted. The results of these inspections will be documented in agency files and available to the public upon request.

Operator Monitoring Reports

The purpose of monitoring is to demonstrate compliance with the terms and conditions of the approved reclamation plans, detect problems or unanticipated events early, and provide a basis for directing remediation of problems. The following is a list of monitoring reports that have either been committed to by ZMI in their proposal or are required by the selected alternative. All reports are to be submitted to both DEQ and BLM. These reports will be available to the public upon request.

Wildlife Mortality

Monthly reports on wildlife mortality, including migratory birds and bats, at the mines are required by ZMI's Plan of Operations. These reports identify species, number, cause of death, and proposed changes to prevent reoccurrence. Reports are submitted monthly, whether or not there has been a mortality.

Monthly Water Resources Monitoring

This report contains results of the operational water tests (described in ZMI's Plan of Operations) taken by ZMI employees using field tests or in-house laboratory tests. The report is submitted by the 16th of the month following the monitoring period.

Quarterly Water Resources Monitoring

This is a report of the water sampling results conducted seasonally and is submitted to BLM and DEQ.

Annual Water Resources Monitoring Report

This report is submitted yearly and includes water resources monitoring results from all sampling events for each calendar year. This report also includes a summary of past annual monitoring results and a trend analysis for the year (see Plan of Operations and Stipulation 44).

Seepage Volume Monitoring

Development of hydrographs from each waste management unit is required as part of the selected alternative. Data on flow volumes will be included in the monthly reports. Hydrographs will be included in the annual water resources report for each waste unit discharge (see Stipulation 45).

LAD Area Use and Monitoring Reports

These reports are required during and after use of the land application areas. They include results of treated water volume, reagent usage, monitoring application rates, soil tests, pore water tests, vegetation condition, and adjacent runoff (see Stipulation 47).

Mine Waste Rock Placement and Characterization Report

ZMI will provide reports and maps showing the placement of each classification of waste rock. This report will include information on the waste rock lithology and its' classification according to acid-generating potential (green, yellow, blue, or stipulated NAG) by lift.

Surface Reclamation Performance

Monitoring of soil loss rate and remediation activities, precipitation infiltration, and revegetation conditions will be conducted concurrent with operations and reclamation. Monitoring reports will be submitted annually. More frequent reporting may be necessary should performance criteria be exceeded (see Stipulations 45 and 46).

Annual Operating and Reclamation Status Report

This is the annual report required by the Metal Mine Reclamation Act. This report describes overall mining and reclamation status. This report is to include ZMI tracking of the status and progress in meeting all agency-imposed stipulations.

Engineering Construction Quality Assurance Reports

These reports are submitted monthly and include results of the quality control tests conducted on the reclamation covers. These reports include quality control documentation of GCL installation, reclamation cover thickness, and reclamation material character (see Stipulation 9).

Final "As Built" Engineering Reports

Final engineering reports are required for the Zortman pit/waste rock repository, the Landusky Gold Bug waste rock repository, and the backfilled Landusky pit/Montana Gulch construction. These reports are to verify that the facilities have been constructed as permitted and meet all applicable stability requirements (see Stipulation 48).

Appeal Processes

Appeals of the BLM Decisions

The authority for the BLM to approve the Plans of Operations is limited to the BLM-administered lands. The decision to approve a Plan of Operations, and the imposition of any associated stipulations, may be appealed by either the operator or by the public. The following appeals process applies:

Any party aggrieved by a decision of the authorized officer may appeal to the Interior Board of Land Appeals, Office of Hearings and Appeals, in accordance with the appeals procedures in 43 CFR, part 4. If an appeal is taken, a notice of appeal must be filed with the BLM Montana State Office, PO Box 36800, Billings, MT 59107, within 30 days after receipt of this decision. The appellant has the burden of showing that the decision appealed is in error. Under the surface management regulations in 43 CFR 3809.4(f), the filing of such an appeal shall not stop the authorized officer's decision from being effective.

Appeals of the DEQ Decisions

The Operating Permits will be modified by the Department under 82-4-337(3), MCA, subject to ZMI's right to request a hearing within 30 days of notice of the modification.

Approvals

This Record of Decision is effective for each agency upon signature of their respective agency official.

Approved by:

Mark A. Simonich, Director
Montana Department of Environmental Quality

6/1/98
Date

Recommended by:

Richard M. Hotaling, Area Manager
Phillips Resource Area, BLM

6-1-98
Date

Approved by:

Larry Hamilton, State Director
Montana State Office, BLM

6/1/98
Date